Electromagnet for controlling the metering valve of a fuel injector.

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Cited documents:

FR2545640
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Abstract of **EP0665374**

The metering valve is controlled by an electromagnet (42) having a fixed core (46), a coil (47), and an armature (43). The core (46) is formed by pressing and subsequently sintering a mixture of powdered ferrous material and an epoxy binder; and presents a low magnetic hysteresis and low parasitic currents, so that, for a given energizing current, a greater magnetic force is achieved and more rapidly, and, for a given magnetic force or maximum operating frequency, the core (46) and/or coil (47) may be made smaller.

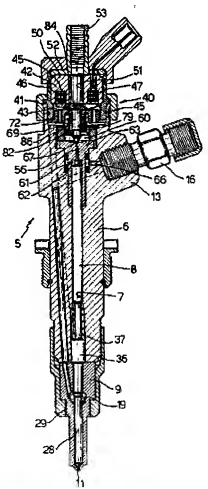

Fig.1

Claims of EP0665374

1. An electromagnet for controlling the metering valve of a fuel injector, comprising a fixed core (46) of magnetizable material; an electric energizing coil (47); and an armature (43) for activating said valve; characterized in that said core (46) is formed by pressing a mixture of powdered ferrous material and an epoxy binder; said core so formed then being sintered.

2. An electromagnet as claimed in Claim 1, characterized in that said ferrous material consists of ferrite; and said epoxy binder is selected from a number of epoxy resins.

3. An electromagnet as claimed in Claim 2, characterized in that said mixture contains from 2% to 50% by weight of said epoxy resin.

4. An electromagnet as claimed in one of the foregoing Claims, characterized in that said mixture is such that said core (46) presents a low magnetic hysteresis and low parasitic currents.

5.An electromagnet as claimed in Claim 4, characterized in that said core (46) presents a substantially constant magnetic inductance alongside variations in the energizing current of said coil (47).

6. An electromagnet as claimed in Claim 5, characterized in that said magnetic inductance varies between 80 and 60 mu H alongside a variation in said current between 100 and 800 A-turns.

7. An electromagnet as claimed in one of the foregoing Claims from 4 to 6, characterized in that the magnetic force of said core (46) reaches 90% of its asymptotic value within less than 80 mu sec.

8. An electromagnet as claimed in Claim 7, characterized in that said coil presents from 16 to 40 turns, and is energized with a voltage of 12 V for 80 to 350 mu sec.

9. An electromagnet as claimed in one of the foregoing Claims, wherein said armature (43) is disk-shaped, and said core (46) presents an annular seat (45) for housing said coil (47); said core (46) being formed by an inner sleeve (57), an outer sleeve (59), and a disk portion (58) connecting said sleeves (57, 59); and said sleeves (57, 59) forming two pole surfaces (48, 49) cooperating with said armature (43); characterized by the fact that said annular seat (45) presents a radial dimension of about 40% of the radius of said armature, and an axial dimension (s) of about 60% of the axial dimension of said core (46); the minimum gap between said armature (43) and said surfaces (48, 49) being about 0.05 mm.